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ABSTRACT

Part of a resource package designed to assist local education agency personnel in improving the quality of instruction and supportive services to students with special needs enrolled in vocational education programs, the sixth of nine instructor guides offers suggestions for assessing the student's level of competence in completing an employment-related task or tasks. Strategies for assessing student performance during the task and/or following completion of a task are discussed with examples provided. (SBH)

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6

INSTRUCTOR'S GUIDE

ASSESSING VOCATIONAL SKILL DEVELOPMENT

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INTRODUCTION

This guide is concerned with the assessment of student performance[1] in a vocational setting. Several techniques for systematically observing and recording learner progress are suggested. The data collected on student performance are to serve two purposes: 1) to assist in determining the learner's level of proficiency on a given task or tasks, and 2) to identify specific modifications which need to be made in the learner's instructional program to increase skill development. In both cases, performance assessment data provide the instructor with important feedback concerning the teaching-learning process.

GUIDELINES AND CONSIDERATIONS

When assessing student performance on a given task or tasks, the vocational instructor may use one or both of two approaches: 1) by observing and recording performance during a task, and 2) through observing and rating the end result, the product of the student's performance. The first strategy is commonly referred to as process assessment, whereas the second strategy is frequently termed product assessment. Erickson and Wentling (1976) illustrate the difference between and the importance of both types of assessment, by using the task of typing a business letter. Product assessment can readily be accomplished by observing the finished product, the typed letter, and judging it according to specified criteria such as accuracy, spacing

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[1] Performance assessment, as used herein, refers to the measurement of the learner's level of competence in completing an employment-related task or tasks.

and neatness of corrections. By focusing on the product alone, the instructor may overlook some important performance deficiencies. For instance, the student may have used the hunt and peck method for this exercise. Although the student met the product criteria for this task, in terms of later speed and performance in a secretarial position this method of typing would be inappropriate. Direct observation of the student while she/he is typing the letter (process assessment) would reveal such shortcomings. In this example, like many vocational tasks, it is important to focus on both process and product variables.

Let's now examine process and product assessment in greater detail. Suggestions for designing and using observational measures are provided.

I. Conducting Process Assessments

Process assessments can be very helpful during the early stages of learning. Through careful observation, the teacher can diagnose student difficulties and take corrective steps before inappropriate patterns set in. This practice is especially important in situations that call for special safety precautions and proper use of tools and equipment.

If a thorough analysis of the task has been conducted, the instructor can use this analysis in checking student progress. Figure 1 on page 3 provides an illustration of how this can be done for the task of cleaning and adjusting a spark plug. The initial steps (or subtasks) for completing this task are listed in the left hand column. The number of times practiced (or trials) and the degree of success (+) or difficulty (-) during each trial are also recorded.

As seen in Figure 1, the student was unsuccessful in performing subtasks 2, 3 and 4 during the first trial. The instructor observed these occurrences and provided additional instruction. As a result, the frequency of errors decreased on the second trial and totally disappeared in three successive practices. By having the student perform the four steps three times in a row, without errors or assistance, correct responses were reinforced. A further advantage of this practice is the instructor now has a strong basis for concluding that learning has occurred and that the probability of the student demonstrating this skill in an actual work setting is very high.

A modified version of the process assessment checklist used in Figure 1 is located in Example Document #1. In this example, the process assessment relates to the use of a commercial washer and dryer.

Figure 1

Task Performance Checklist

Task(s) Cleaning & Adjusting a Sparkplug Student Michelle Ansley

Observation Date(s) 10/12/77

Subtasks*	Number of Trials				
	1	2	3	4	5
1. Pick up and place plug in a solution solvent	+	+	+	+	+
2. Remove and place plug in plug holder jig with bottom up	–	+	+	+	+
3. Wire brush until clean (use clean condition picture for comparison)	–	+	+	+	+
4 Determine plug gap by using different size gauges and placing them between the gap until appropriate size is located	–	–	+	+	+

*These subtasks were extracted from a task analysis in Instructional Development for Special Needs Learners by L. Allen Phelps, Department of Vocational-Technical Education, University of Illinois, Urbana, 1976, p. 195 (ED 133-940).

II. Conducting Product Assessment

The assessment of the outcome or product of learner activity is, in general, less difficult than attempting to rate the processes involved in developing the product. For example, it is easier to assess a product from a printing press than it is to rate the sequence and adequacy of the processes used in printing that particular product. This tends to be true because the criteria for measuring a product are usually prespecified and are often stated in absolute terms. In contrast, there may be many different ways to successfully complete the product.

If the criteria for measuring products are absolute such as "plus or minus .01 inches" or "within 20 minutes with no errors" then a yes-no or pass-fail checklist would be appropriate. If, however, there is a "range of correctness" then a graphic rating scale could be used. Example Document #2 provides a sample graphic rating scale for measuring the product of a woodworking project.

III. Conducting Process and Product Assessments

In many employment-related tasks both process and product aspects are considered significant and need to be assessed. The work-education coordinator, for example, usually focuses in on process and product performance when observing the student on a job station (See Example Document #5, Guide 5). In the building trades entry level performance evaluation sample in Guide 3 (Example Document #5a) both process and product variables were considered.

As suggested earlier, process performance is typically emphasized during the early stages of learning and product performance later, after the process skills have been mastered.

IV. Using Rating Systems to Measure Student Performance

Two instruments for use when observing and recording student performance have been suggested: 1) a checklist, and 2) a graphic-rating scale. Checklists enable the instructor to assess specific performance skills. In addition, checklists are useful when many behaviors occur in a short period of time. For instance, in assessing the student during a sales transaction such items as appearance, sales approach and accuracy of information given would likely be considered. A simple check sheet could be completed during this activity and serve as a helpful tool in a follow-up discussion with the student.

The instructor need not be the only person to rate student performance. With some preparation others can use a rating scale to evaluate student performance, such as the student's peers, employers, supervisor's or laboratory assistants. In addition, the student can use the rating scale to rate her/his own work.

Rating scales can serve as a reliable indicator of student proficiency if several different aspects of performance are rated

separately. By including different aspects of the skill in the rating scale we provide clues for ourselves and our students as to the areas of student competence and inadequacy. For example, in a woodworking course on building furniture we could use the following rating scale:

	Choice of Materials	Finish	Joints	Overall Design
Excellent				
Good	✓		✓	✓
Needs work		✓		

Rating scales and checklists do not always provide the student with sufficient information which he or she can use in order to reach the desired level of performance. These assessment tools tell the student where additional work needs to be done, but seldom tell the student what might be done differently. Instructor comments can provide such information. It is especially helpful if such comments are in written form and accompany the observation instrument. Let's, for example, take a look at two different types of feedback provided to the student who build a bookcase.

Weak	Better
Your joints are inadequate.	You used simple mitered joints with glue and screws with plugs to cover screw heads. You could have gotten a "cleaner" effect with dado joints and veneer edge strips along the front and back edges.
Finish is incomplete and inappropriate.	First, you might consider finishing the back of the shelves so that the case could be positioned anywhere in the room. Secondly, the design is rather "Scandanavian" --a more natural finish of sealer and tung oil would have brought out the grain and given warmth to the rather stark but clean lines of the case.

It is apparent from the comment at the left that the student made mistakes in joints and finish. From the comments on the right, however, more information is provided. The student can see that the joint and finish were really "OK" in terms of technical skill, but the instructor expects more than technical ability. Furthermore, the student will likely see her/his work as being important since the instructor went into such detail over the case. Such comments can be very effective in providing the student with a more accurate picture of her/his own abilities.

Another important consideration in designing a checklist or a rating scale is to choose a procedure that will allow quick, easy-to-read displays that can be readily understood by the student, other instructors, administrators and parents.

The use of the checklist and the rating scale were reviewed. Variations of these are possible (i.e., ranking, product and numerical scales) and can be adapted for individual use. For a more detailed discussion on this subject see Measuring Student Growth by Richard C. Erickson and Tim L. Wentling, Allyn and Bacon, 1976.

FOR FURTHER INVESTIGATION

For additional information on conducting performance assessments in vocational settings see:

Bloom, Benjamin S.; Hastings, Thomas and Madaus, George F. Handbook on Formative and Summative Evaluation of Student Learning. New York: McGraw-Hill Book Company, 1971.

Boyd, J. L. and Shimberg, B. Handbook of Performance Testing. Princeton, New Jersey: Educational Testing Service, 1971.

Brolin, Donn E. Vocational Preparation of Retarded Citizens. Columbus, Ohio: Charles E. Merrill, 1976.

Erickson, Richard C. and Wentling, Tim L. Measuring Student Growth: Techniques and Procedures for Occupational Education. Boston, Mass.: Allyn and Bacon, Inc., 1976.

Gronlund, Norman E. Constructing Achievement Tests. Second Edition. Englewood Cliffs, New Jersey: Prentice-Hall Inc., 1977.

Wentling, Tim L. Measurement and Evaluation for the Special Needs Learner. Industrial Education, May-June, 1978, pp. 29-32.

EXAMPLE DOCUMENT #1

Process Assessment Checklist*

Unit: Care of Clothing Student: Marvin Neal

Task: Use of Commercial Washer and Dryer Date: 2/16/78

Subtasks	Performance on Subtasks	Comments
1. Separate clothing according to proper colors.	+	
2. Place separate clothes in washer, select proper setting according to color.	-	Needed help in determining proper setting--hot, warm, cold.
3. Measure correct amount of soap to be used for each load of clothes.	+	Knows proper amounts.
4. Select and determine the correct amount of change to operate washer.	+	Understands the correct amount of money to use.
5. Upon doing the above steps close washer lid and start machine.	+	Understands how to start machine.
6. Place fabric softener into machine during rinse cycle.	+	Demonstrated after being told proper amount to be used.
7. Remove clothes when machine stops completely.	+	Understands the safety factor involved.
8. Sort permanent press garments from those requiring normal setting. Select setting.	-	Needed help in determining setting.
9. Place proper coins into dryer after separating clothes and putting garments into dryers.	+	Understands this subtask.
10. Fold or hang all garments neatly.	-	Needs to work on folding so that wrinkles don't develop.
Recommendation: Work with Marvin on subtasks 2, 8 and 10. Then, have him do the total task independently on two separate occasions.		

*Modified and used by Albia High School, Albia, Iowa.

EXAMPLE DOCUMENT #2

Product Assessment Form for a Woodworking Project*

1. Evidence of excessive glue under finish/Damage from glue

1	2	3	4	5	6	7
Bubbles of glue under finish		Considerable discoloration		Slight discoloration		No evidence of glue

2. Evidence of clamp damage

1	2	3	4	5	6	7
Splitting		Deep impressions		Marred surface		No evidence of clamps

3. Evidence of inconsistent clamping pressure in assembly (squareness)

1	2	3	4	5	6	7
Parts do not fit		Considerable warp		Some distortion		All parts square

4. Evidence of lamination problems

1	2	3	4	5	6	7
Splitting/ open joint		Buckling/ wide joint		Slight offset		Flat/tight joint

5. Evidence of the improper use of fasteners (screws)

1	2	3	4	5	6	7
Not holding/ head-stripped		Loose/head damage		Poor seating		Secure/no head damage

6. Evidence of the improper use of fasteners (finish nails)

1	2	3	4	5	6	7
Bent nail/ surface damage		Nail showing		Under or overfilled		Fill blends with surface

*Adapted from Handbook on Formative and Summative Evaluation of Student Learning by Bloom, Hastings and Madaus. Copyright 1971, McGraw-Hill Book Company. Used with permission of McGraw-Hill Book Company.